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APPENDIX

TO THE

FIFTH EDITION

OF

DANA'S MINERALOGY.

BY

GEORGE J. BRUSH,

PROFESSOR OF MINERALOGY IN THE SHEPFIELD SCIENTIFIC SCHOOL OF YALE COLLEGE.

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## PREFATORY NOTE.

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THIS Appendix, prepared with the co-operation of Professor DANA, is intended as one of a series to be published from time to time. It includes descriptions of 87 minerals announced as new, and also some important facts regarding a few old species, published since the appearance of the Mineralogy in 1868.

An alphabetical arrangement is adopted for convenience of reference. The species included, arranged according to the general subdivisions in the classification of minerals, are as follows:—

### 1. *Native Elements.*

- |             |               |
|-------------|---------------|
| 1. Diamond. | 2. Maldonite. |
|-------------|---------------|

### 2. *Sulphids, Arsenids, etc.*

- |  |                          |
|--|--------------------------|
| 3. Arsenical Cobalt, Einfach-Arsenik-Cobalt.   | 11. Klaprotholite.       |
| 4. Beyrichite.                                 | 12. Metacinnabarite.     |
| 5. Diaphorite.                                 | 13. Orileyite.           |
| 6. Dyscrasite : Stibiotriargentite, Stibiohex- | 14. Osbornite.           |
| argentite.                                     | 15. Polyargyrite.        |
| 7. Epiboulangerite.                            | 16. Rionite.             |
| 8. Epigenite.                                  | 17. Tellurwismuthsilber. |
| 9. Glaucopyrite.                               | 18. Wolfachite.          |
| 10. Julianite.                                 | 19. Sylvanite.           |

### 3. *Chlorids, Fluorids.*

- |                                    |                            |
|------------------------------------|----------------------------|
| 20. Nadorite, Sb, Pb, Cl, O.       | 22. Ralstonite, Al, Fl, H. |
| 21. Nantokite, Cu <sup>2</sup> Cl. | 23. Sellaite, Mg Fl.       |

### 4. *Oxyds.*

- |                                   |                                      |
|-----------------------------------|--------------------------------------|
| 24. Chrompicotite (Spinel group). | 28. Namaqualite (near Hydrotalcite). |
| 25. Ilsemanite, Mo + 4Mo.         | 29. Rabbionite.                      |
| 26. Jacobsite (Spinel group).     | 30. Brookite.                        |
| 27. Lithiophorite (near Asbolan). | 31. Tridymite.                       |

### 5. *Anhydrous Silicates.*

- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| 32. Amblystegite (Hypersthenite). | 36. Bismutoferrite.                 |
| 33. Aspidolite (Mica Group).      | 37. Hortonolite (Chrysolite Group). |
| 34. Asteroite (Pyroxene).         | 38. Monzonite.                      |
| 35. Barettite.                    | 39. Roepperite (Chrysolite Group).  |

6. *Hydrous Silicates.*

- |                                       |                                |
|---------------------------------------|--------------------------------|
| 40. Antillite (near Serpentine).      | 52. Næsumite.                  |
| 41. Aquacreptite (near Hydrophite).   | 53. Nigrescite.                |
| 42. Cyanochalcite (near Chrysocolla). | 54. Plumballophe.              |
| 43. Diabantachronyn (Chlorite Group). | 55. Restormelite.              |
| 44. Ephesite.                         | 56. Reissite (near Monophane). |
| 45. Epiphanite (near Eukamptite).     | 57. Talcosite.                 |
| 46. Euralite (near Delessite).        | 58. Uranotil.                  |
| 47. Gümbelite (near Pinite).          | 59. Westanite (near Wörthite). |
| 48. Hallite.                          | 60. Lesleyite.                 |
| 49. Hypochlorite.                     | 61. Pattersonite.              |
| 50. Ivigtite.                         | 62. Selwynite.                 |
| 51. Milarite (a Zeolite?).            |                                |

7. *Tantalates, Columbates.*

- |                               |                                   |
|-------------------------------|-----------------------------------|
| 63. Ferrolmenite (Columbite). | 64. Kochelite (near Fergusonite). |
|-------------------------------|-----------------------------------|

8. *Phosphates, Arsenates, etc.*

- |                       |                                 |
|-----------------------|---------------------------------|
| 65. Andrewsrite.      | 72. Lünebergite.                |
| 66. Cœruleolactite.   | 73. Montebrasite (Amblygonite). |
| 67. Durangite.        | 74. Redondite.                  |
| 68. Guano Phosphates. | 75. Sarcopside (Triplite).      |
| 69. Isoclasite.       | 76. Trögerite.                  |
| 70. Kollophan.        | 77. Walpurgite.                 |
| 71. Lime-Wavellite.   | 78. Zepharovichite.             |

9. *Borates.*

- |                |                   |
|----------------|-------------------|
| 79. Sussexite. | 80. Winkworthite. |
|----------------|-------------------|

10. *Tungstates, Molybdates, Vanadates.*

- |                 |                  |
|-----------------|------------------|
| 81. Wolframite. | 83. Pucherite.   |
| 82. Eosite.     | 84. Vanadiolite. |

11. *Sulphates, Chromates.*

- |                      |                      |
|----------------------|----------------------|
| 85. Guano Sulphates. | 88. Laxmannite.      |
| 86. Caledonite.      | 89. Phosphochromite. |
| 87. Simonyite.       |                      |

12. *Carbonates, Oxalates.*

- |                              |                     |
|------------------------------|---------------------|
| 90. Bästnaesite (Hamartite). | 91. Guano-oxalates. |
|------------------------------|---------------------|

13. *Carbo-hydrogen Compounds.*

- |                  |                    |
|------------------|--------------------|
| 92. Ambrosine.   | 94. Trinkerite.    |
| 93. Rosthornite. | 95. Wollongongite. |

## APPENDIX I.\*

### 1. Minerals described as new species.

**411. Antillite.**—A name given by C. U. Shepard to a substance he considers to be a hydrated bronzite. It occurs both massive and crystalline, presenting minute coppery laminae, with a fibrous cleavage.  $H.=3.5-4$ .  $G.=2.52$ . Color dark greenish-brown. An analysis gave Si 39.30, Mg 36.12, Fe 6.70, H 16.79, with traces of Cr, Ca, K=98.91. This composition approaches that of serpentine or deweylite. (Appendix to Catalogue of Meteorites, Amherst, Mass., January 1, 1872).

**235. AMBLYSTEGITE.**—*G. vom Rath*, Pogg. Ann., cxxxviii, 531.

Orthorhombic:  $i\bar{i} \wedge I=135^{\circ} 50'$ ,  $i\bar{i} \wedge 1\bar{2}=119^{\circ} 26'$ ,  $\frac{1}{2}i \wedge \frac{1}{2}\bar{i}=163^{\circ} 47'$ ,  $i\bar{i} \wedge \frac{1}{2}\bar{i}=98^{\circ} 6\frac{1}{2}'$ . Cleavage not observed. Hardness nearly equal to quartz.  $G.=3.454$ . Lustre adamantine-vitreous. Color brown to reddish-brown. Streak greenish-gray. Translucent. Fracture conchoidal. Analysis, *G. vom Rath* (l. c.):

Si	Al	Fe	Mg	Ca
49.8	5.05	25.6	17.7	0.15=98.30

Only half a gram was available for analysis, and the state of oxydation of the iron was not determined. B. B. difficultly fusible without intumescence to a black glass. Not decomposed by muriatic acid. Found at Lake Laach. Amblystegite is closely related to hypersthenite in form and chemical composition. V. v. Lang has recently discovered crystals of hypersthenite in the meteorite of Breitenbach which give the same planes as amblystegite, and vom Rath now announces (Jahrb. Min., 1871, 642) the identity of his supposed new species with hypersthenite.

**799 B. AMBROSINE.** *C. U. Shepard*, Rural Carolinian, i. p. 311.

In rounded masses. Color yellowish to clove-brown. Fracture conchoidal. Lustre, resinous. Becomes electric on friction. Melts at about 460° F. to a clear yellowish liquid; softens at a lower temperature. Gives off "succinic acid" before melting; on fusion gives an agreeable balsam odor, unlike that from the resins of ordinary pines, and a dark brown non-volatile fluid remains as long as the melting heat is kept up. Combustible, leaves no ash. Soluble for the most part in oil of turpentine, alcohol, ether, and chloroform, as also in potash. Found in the phosphatic beds near Charleston, S. C., having originated in the eocene formation.

**ANDREWSITE.** *N. S. Maskelyne*, Chem. News, xxiv, 99.

In globular disks with radiated structure resembling wavellite.  $G.=3.475$ . Color bluish-green. Composition, a hydrous phosphate of iron and copper. An average of four determinations gave 10.82 per cent. of copper; and according to Maskelyne the analyses (not given in the article quoted) "justify the formula  $3(\text{Fe}^{\text{II}}\text{P}, \text{Fe}^{\text{III}}\text{P}) + \text{Cu}^3\text{P}$ , in which, however, a portion of the ferric phosphate is replaced by ferrous phosphate, as in vivianite is frequently the case with the two phosphates."

Occurs in Cornwall on a quartzose veinstone associated with limonite and göthite, and interpenetrated with a mineral resembling, if not identical with, dufrénite. Requires further description.

**71 A. Arsenical cobalt.** Under the title *Einfach-arsenik-cobalt*, Kenngott calls attention to a mineral which appears to be hexagonally crystallized arsenid of cobalt, occurring with barite and quartz at Bieber (Jahrb. Min., 1869, 754).

\* This appendix contains descriptions of minerals announced as new since the publication of this work in 1868. A few notes are added at the end, on previously described species. It has been prepared by Prof. G. J. Brush. The black-faced figures indicate the number of the species, as arranged in the classification adopted in the Mineralogy.—NEW HAVEN, March 1, 1872.



**238 A. ASPIDOLITE.**—Aspidolith, *F. v. Kobell*, Ber. Ak. München, March 6, 1869.

Orthorhombic: in prisms giving approximatively  $120^\circ$  and  $60^\circ$ . The smaller sides show reëntering angles from twinning, or an aggregation of several crystals, giving the base an oval shield-like appearance. Optically biaxial, with the divergence angle  $11^\circ 55'$  for the red rays. Bisectrix normal to cleavage plane.  $H.=1-2$ .  $G.=2.72$ . Lustre pearly, sub-metallic. Color olive-green, in thin leaves brownish-yellow. Foliated, leaves flexible, but not elastic. An analysis afforded von Kobell:

Si	Al	Mg	Fe	Na	K	H
46.44	10.50	26.30	9.00	4.77	2.52	1.33=100.86

The oxygen ratio of R, K, and Si is 14.16 : 4.91 : 24.66, or 3 : 1 : 5. The composition approaches that of a soda phlogopite.

B. B. exfoliates like vermiculite, giving water in the closed tube. In the forceps difficultly fusible to a dirty gray-white glass. Entirely decomposed by muriatic acid, leaving the silica in pearly scales.

Found in Zillerthal, in Tyrol, associated with chlorite.

**238. Asteoroïte**—A name given to a variety of stellate radiated pyroxene, from Nordmark, in Sweden, by L. J. Igelström (B. and H. Ztg. xxix. 8, 1870). It is ash-gray to white in color, has a silky lustre, is opaque, becomes bronze color on exposure. Analysis gave Si 48.48, Fe 22.24, Mn 4.12, Ca 17.00, Mg 4.18, ignition 2.83=98.85. The oxygen ratio of R to Si is 1:2. It is a pyroxene near hedenbergite, but containing a portion of the iron replaced by manganese.

**415 B. AQUACREPTITE.**—*C. U. Shepard*, Am. J. Sci. II. xlvii. 256.

Massive, occurring in irregular polyhedral fragments, with flat or concave surfaces.  $H.=2.5$ .  $G.=2.05-2.08$ . Lustre dull. Color yellowish-brown. Streak orange-yellow. Brittle. Adheres to the tongue. Falls to pieces in water, with a crackling noise.

Analyses—1. C. U. Shepard; 2. J. H. Eaton (l. c.):

	Si	Al	Mg	Fe	H
1.	41.00	4.00	17.60	13.30	23.00=98.90
2.	43.03	5.56	19.58	12.30	17.40=97.87

Decomposed by muriatic acid. Found in a vein in serpentine, at Westchester, Pa. It is near hydrophite. Needs further investigation.

**732 A. BASTNÄSITE.** *Huot*, Min. i. 296 (1841). Basiskfluorcerium, *Hisinger*, Cef. Ak. Stockh., 1838, 189. Hamartite, *A. E. Nordenskiöld*, Cef. Ak. Stockh., 1868, 399.

The so-called basic fluorid of cerium, from Bastnäs, examined by Hisinger, has been reëxamined by A. E. Nordenskiöld, and shown to be a fluo-carbonate. As the name basic fluorid, or hydrofluocerite, conveys an incorrect idea of the composition of the mineral, Nordenskiöld gives it the new name *hamartite*, overlooking the fact that Huot had already named the mineral *bastnäsit*, after the locality.

Orthorhombic?—Found in small masses imbedded between allanite crystals. Shows distinct cleavage.  $H.=4$ .  $G.=4.93$ . Lustre greasy. Color wax-yellow.

Composition Ce F+2 (Ce, La)  $\bar{C}$ =La 46.15, Ce 3.87, Ce 21.12,  $\bar{C}$  20.20, F 8.72=100. Analysis by Nordenskiöld (l. c.)—

$\bar{C}$	La	Ce	H	F+O
19.50	45.77	28.49	1.01	(5.23)=100

Nordenskiöld, having shown by direct determination that but 1.01 per cent. water exists in the mineral, and that the balance of loss on ignition is carbonic acid, finds, on recalculating Hisinger's early results with this correction, a close correspondence with the above, viz., La, Ce, 73.59,  $\bar{C}$ , H 19.11, F+O, 5.76, Si 1.25=99.71. The direct determination of fluorine by Hisinger gave 9.95 per ct.

In the closed tube gives but little water, blackens, then becomes whitish-yellow and opaque; also gives a weak reaction for fluorine. Infusible. With acids effervesces slightly. With sulphuric acid gives off fluohydric acid, even after ignition. Found only at the Bastnäs Mine, Riddarhyttan, Sweden. The percentage composition brings this mineral near kischtimite (p. 703). It also resembles kischtimite in some of its physical characters, and further investigation may prove these minerals to be identical.

*Barettite*. A name given by Bombicci to a mineral from Traversella in the province of Ivrea, having the following characters:—Occurs in nodular, radiated, and fibrous masses.  $H.=2.5$ .  $G.=2.5$ . Color apple-green. Streak white. Feel soapy. Analysis gave Si 30.00, Ca 33.70, Mg 10.00, Fe 7.20, Al 1.60, C 9.1, H 1.2, with a small amount of sulphuric acid, and probably also containing phosphoric acid and alkalis. (Atti della Soc. Ital. di Sc. Nat. xi., in Jahrb. Min., 1868, 750.

**66 A. BEYRICHITE.** *K. Th. Liebe, Jahrb. Min., 1871, 840.*

Hexagonal? Occurring in screw-shaped groups, radiated in structure, the constituent prisms of which are about 70 mm. long and 8 mm. wide. One terminal plane makes an angle of  $81^\circ$  with the vertical axis; a second, rarer, inclines to the first at an angle of  $144^\circ$ , the angle of the rhombohedron of millerite. Cleavage rather perfect parallel to the first of these planes, and no other cleavage direction observed, so that the rhombohedral character of the crystals is not certain.

$H=3-3.5$ .  $G.=4.7$ . Lustre metallic. Color lead-gray. Composition  $3 Ni S + 2 Ni S^2 = S$  43.21, Ni 56.79=100. An analysis by Liebe gave:

S	Fe	Ni
43.86	2.79	54.23=99.88

B. B. in the closed tube decrepitates and gives a sublimate of sulphur, on charcoal fuses to a brass-yellow magnetic globule. Soluble in nitro-muriatic acid, yielding an emerald green solution.

From Lammrichs Kaul Mine in Westerwald, where it is associated with millerite.

*Bismutiferite*. *A. Frenzel, J. pr. Chem., II., iv. 355.* This name has been given to a so-called hypochlorite from Schneeberg, having  $H.=1-2$ .  $G.=4.47$ , and containing Si 23.08 Fe 33.33, Bi 43.26=99.67. Frenzel further distinguishes two varieties of hypochlorite, *antimony-hypochlorite* from Bräunsdorf, and *bismuth-hypochlorite* from Schneeberg; both of these are stated to be mixtures, and not homogeneous minerals.

**189. Chrompicotite.** *T. Petersen, J. pr. Ch., cvi. 137.*

A variety of chromite occurring in rounded octahedrons.  $H=8$ .  $G.=4.115$ . Lustre vitreous to greasy. Color black. Analysis by T. Petersen and K. Senfter (l. c.) afforded:

Cr	Al	Fe	Mn	Co, Ni	Mg
56.54	12.13	18.01	0.46	tr.	14.08=101.22

This composition does not differ much from that of the magnesian alumina chromite from Baltimore, analyzed by Abich (Anal. 3, 4, p. 153), and that from Lake Memphramagog, examined by Hunt. If this variety is to have a new name it should have reference to chromite rather than picotite, a magnesia iron alumina spinel with only 7 per cent. of chromic oxyd. Its hardness is the chief character which favors its being classed with picotite.

From Dun Mountain, New Zealand.

**554 C. COERULEOLACTITE.** *Cœruleolactin, T. Petersen, Jahrb. Min., 1871, 353.*

Crypto-crystalline to micro-crystalline. Fracture uneven to conchoidal.  $H.=5$ .  $G.=2.552-2.593$ . Color milk-white passing into light copper-blue. Streak white. Composition:  $Al^3, P^2 + 10 H = P$  36.74, Al 39.37, H 23.29. Analysis by Petersen (l. c.):

P	Al	Fe	Cu	Zn	Ca	Mg	Si	F	H
36.33	35.11	0.93	1.40	tr.	2.41	0.20	1.82	tr.	21.23=99.43

Excluding the iron (supposed to exist as limonite), the silica, and copper, lime and magnesia with sufficient phosphoric acid ( $=3.27 P$ ) to make an ortho-phosphate, and calculating the remaining constituents (89.26 p. c.) up to 100 we have for the true composition of the mineral, according to Petersen,  $P$  37.04, Al 39.34, H 23.62, corresponding very closely with the above formula. B. B. decrepitates, infusible, on charcoal turns reddish-gray. With cobalt solution gives a deep blue. Moistened with sulphuric acid colors the flame green. With the fluxes gives a faint reaction for copper. Soluble in mineral acids, also in fixed caustic alkalis.

From the Rindsberg Mine near Katzenellnbogen, Nassau.





The oxygen ratio of  $\ddot{R}$ ,  $\ddot{F}$  and  $\ddot{A}s$  is 3.74 : 11.07 : 19.16, or nearly 1 : 3 : 5, giving the formula  $(\frac{1}{2} R^3 + \frac{3}{2} F) \ddot{A}s$ , in which a portion of the oxygen is replaced by fluorine.

In the closed tube blackens at a moderate temperature, but regains its color on cooling; at a higher heat fuses easily to a yellow glass and gives a faint white volatile sublimate, etching the tube slightly. The same in the open tube, with evolution of acid fumes, reddening litmus paper. On charcoal, B. B. fuses readily and gives a white sublimate with a strong arsenical odor in R. F. With soda and charcoal powder in a matrass yields a sublimate of metallic arsenic. With the fluxes reacts for iron and manganese. In the forceps fuses at 2, giving an intense soda flame. Decomposed by sulphuric acid with evolution of fluohydric acid.

Found near Durango in Mexico. The chemical composition of this mineral places it near amblygonite, an analogous fluo-phosphate, although the form of durangite is monoclinic while amblygonite is triclinic.

35. *Dyscrasite*. T. Petersen (Pogg. Ann., cxxvii, 377), in a review of the analyses of dyscrasite, endeavors to show that there are two native compounds of antimony and silver, to one of which he gives the name *stibiotriargentite* ( $Ag^3 Sb^2$ ), and the other, *stibiohexargentite* ( $Ag^6 Sb^2$ ). The former has a density of 9.611–9.77, and the latter 10.027. All recorded analyses that do not give one of these formulas he considers either to be erroneous or to have been made on a mixture of the above minerals.

617 A. EOSITE. A. Schrauf, Min. Beobachtungen, ii, 20, in Sitzb. Ak. Wien, February, 1871.

Tetragonal, in minute octahedrons ( $\frac{1}{2}$  mm. diam.) a : b : c = 1.3758 : 1 : 1. (Basal angle of octahedron 125° 40'). Inclination of basal plane to octahedral 117° 10'. H.=3–4. Color deep aurora-red, between that of crocoite and realgar, and much darker than red wulfenite. Streak brownish orange-yellow. Heated in the closed tube darkens, but regains its color on cooling. Fused with bi-sulphate of potash gives a mass which is light yellow while hot, becomes, on cooling, first reddish-brown and finally brownish orange-yellow. This dissolved in water and boiled with tin-foil colors the solution faint greenish-blue. Not so rapidly acted upon by muriatic acid as crocoite or wulfenite. When a splinter of eosite is placed on a glass plate, and treated with muriatic acid, with subsequent addition of alcohol, and then gently evaporated, it affords a blue to bluish-green coating, with a green precipitate on the edges. From these reactions, and a series of comparative tests made with crocoite, wulfenite, and vanadinite, Schrauf concludes that eosite is vanadio-molybdate of lead. Found implanted in very minute crystals on pyromorphite and cerussite at Leadhills, Scotland.

122 A. EPIBOULANGERITE. M. Websky, ZS. G. Ges., 1869, p. 747.

Orthorhombic? occurring in striated prismatic needles G.=6.309. Lustre metallic. Color dark bluish gray, almost black. Structure granular, acicular. Analyses, 1, 2, Websky (l. c.):

	S	Sb	Pb	Ni	Fe	Zn
1. Granular.	21.89	20.77	56.11	0.20	0.60	0.29=99.86
2. Needles.	21.31	20.23	54.88	0.30	0.84	1.32=98.88

Websky considers the mineral as probably a product of the decomposition of Boulangerite, from which it differs in containing more sulphur and correspondingly less antimony. Found with galena, pyrite, blende, and mispickel, at Altenberg in Silesia.

132 A. EPIGENITE. T. Petersen, Pogg. Ann., cxxvii, 502, Arsenikkupferwismuthertz, Epigenit. Sandberger.

Orthorhombic, observed planes,  $I, 1-\bar{2}, 1-\bar{1}, I \wedge 1-\bar{2}=110^\circ 50'$ . H.=3.5. Lustre feebly metallic. Color steel-gray. Streak black. Fracture granular.

Composition  $6R S + As^2 S^3$ . Analysis, Petersen (l. c.):

	S	As	Fe	Cu	Bi	Ag-Zn
1.	31.57	12.09	13.43	40.32	2.12	tr.=99.53
2.	32.34	12.78	14.20	40.68=100.00		

No. 2 is No. 1 after deducting the 2.12 Bi which was present as intermingled wittichenite, and as such was combined with 1.84 Cu and 0.98 S. In the closed tube gives first sulphur then sulphid of arsenic. B.B. on charcoal gives an arsenic reaction and a magnetic slag with copper globules. Soluble in nitric acid with separation of sulphur.

Occurs sparingly at Neuglück Mine in Wittichen.

**289. Epiphanite.** *Igelström*, Öfv. Ak. Stockh., 1868, p. 29. This name has been given to a chlorite like mineral from Tvärån in Wernmland, Sweden. The composition *Igelström* found to be  $\text{Si } 37.10$ ,  $\text{Al } 21.13$ ,  $\text{Fe } 20.00$ ,  $\text{Mn tr}$ ,  $\text{Mg } 14.03$ ,  $\text{H } 7.83=100.09$ . It approaches *Kenngott's* *eukamptite* (p. 307) and gives the same formula plus one atom of water  $\text{R}^2 \text{Si} + \text{Al Si} + 2 \text{H}$ .

**449. Euralite.** A name given by F. J. Wiik to a chloritic mineral occurring in seams in clefts of hyperite rock in the parish of Eura, Finland. It is apparently amorphous, but breaks under the hammer into prismatic fragments.  $\text{H}=2.5$ .  $\text{G}=2.62$ . Color dark-green to black. B. B. fuses easily to a magnetic globule. Soluble in muriatic acid. An analysis gave  $\text{Si } 33.68$ ,  $\text{Al } 12.15$ ,  $\text{Fe } 6.80$ ,  $\text{Fe } 15.66$ ,  $\text{Mg } 17.92$ ,  $\text{Ca } 1.34$ ,  $\text{H } 11.49=99.04$ . Wiik suggests that this composition is near *delessite*, which it also resembles in its mode of occurrence. (*Jahrb. Min.* p. 357.)

**474. Ferro-ilmenite**, a name given to a variety of *columbite* from Haddam, Connecticut (*Hermann, J. pr. Chem.*, II. ii. 118).

**93 A. GLAUCOPYRITE.** *F. Sandberger, J. pr. Chem.*, II. i. 230. Orthorhombic. Planes  $i-i$ ,  $I$ ,  $m-i$ .  $\text{H}=4.5$ .  $\text{G}=7.181$ . Lustre metallic. Color light lead-gray to tin-white. Streak grayish-black. Composition  $\text{Fe S}^2 + 12 (\text{Fe}, \text{Co}, \text{Cu}) (\text{As}, \text{Sb})^2 = \text{S } 2.47$ ,  $\text{As } 69.45$ ,  $\text{Fe } 28.08$ . Analysis R. Senfter (l. c.):

S	As	Sb	Fe	Co	Cu
2.36	66.90	3.59	21.38	4.67	1.14=100.04

In the closed tube gives a sublimate of arsenic with only a small amount of sulphid. B. B. on charcoal gives arsenic fumes with an antimony coating. After roasting yields with soda a magnetic slag with spangles of metallic copper. With the fluxes reacts for iron and cobalt. Decomposed by nitric acid leaving a residue of antimonious acid. Found in the mines of Guadalcanal in Andalusia, Spain. Belongs near *Löflingite*, p. 77.

*Guano Minerals.* C. U. Shepard, *Rural Carolinian*, i. 470. The substances described occur in the guano of Guanape Island, 400 miles north-east of the Chincha Islands.

*Guanapite* occurs in irregular balls and veins looking like red rock-salt but having a rhombic cleavage.  $\text{H}=1-2$ .  $\text{G}=2.3$ . Soluble in 4-5 pts. of water at  $60^\circ$ . Taste bitter and saline. Analysis gave sulphate of potash 67.75, sulphate of ammonia 27.88, oxalate of ammonia 3.75=99.38. It loses ammonia on exposure to the air. Heated to redness leaves a residue of about 70 pr. ct. of sulphate of potash. It is near *Taylorite* (p. 614) in composition. *Guanoxalite* is stated to be a pseudomorph of birds' eggs; the specimens are exteriorly white, "and seem to retain portions of the original shell, but these when tested seemed to be a mixture of phosphate and oxalate of lime." Within the substance is foliated and has a rhombic cleavage. Color cream white; lustre pearly; translucent.  $\text{H}=1-2$ .  $\text{G}=1.58$ . When heated swells up, turns black, partially fuses, gives off ammonia fumes, and leaves a white residue of sulphate of potash. Composition stated to be sulphate of potash 40.20, oxalate of ammonia 29.57, water 30.46=100.23—a very doubtful compound. *Oxammite*, *phosphammite*, and *biphosphammite* are other names given by Shepard for supposed new species consisting of oxalate of ammonia, phosphate of ammonia, and biphosphate of ammonia.

**422 A. GÜMBELITE.** *F. von Kobell, Ber. Ak. München*, March 5th, 1870.

In thin, short fibrous layers in clay slate. Color light greenish-white. Translucent. Lustre pearly. Soft and flexible. Analysis, v. Kobell (l. c.):

Si	Al	Fe	Mg	K	H	X <sup>a</sup>
50.52	31.04	3.00	1.88	3.18	7.00	1.46=98.08.

(<sup>a</sup>) Undecomposed mineral.

The oxygen ratio of R, K, Si and H is as 1 : 12 : 21 : 5, which scarcely leads to a satisfactory formula. In the closed tube yields water. B. B. exfoliates somewhat like *pyrophyllite*. Fuses at 4. Not acted upon by acid.

Found at Nordhalben near Steben, in Oberfranken. The composition approaches that of *pinit* or *neuroilite* (p. 482).

*Hallite.* A name given by A. R. Leeds to a flexible micaceous mineral of a brown color, occurring in Chester Co., Pa., and supposed to possess distinguishing optical properties. (*Jour. Frank. Inst.*, III, lxii. 70.)

*Hamartite.* See Bastnaesite.

**259 A. HORTONOLITE.** *G. J. Brush*, *Am. J. Sci.* II., xlviii. 17., July, 1869.

Orthorhombic. Observed planes  $O$ ,  $i-i$ ,  $i-2$ ,  $1-i$ ,  $1-2$  and  $1-4$  (J. M. Blake, l. c.),  $i-i \wedge i-2 = 65^\circ$  (normals)  $1-4 \wedge i-i = 77^\circ-80^\circ$ ,  $i-i \wedge 1-2 = 69^\circ-70^\circ$ .  $i-i \wedge 1-i$   $40^\circ 45'$ . Acute bisectrix perpendicular to  $i-i$ , optic axes in a plane parallel to  $O$ , angle between axes  $83^\circ-86^\circ$ , measured in olive oil (J. M. Blake).  $H.=6.5$ .  $G.=3.91$ . Lustre vitreous, subresinous. Color yellow to yellowish-green, in large masses almost black. Composition  $R^2 \text{Si}$ . Analysis, W. G. Mixer (l. c.):

	Si	Fe	Mn	Mg	Ca	K	Ign.
$\frac{2}{2}$	33.59	44.37	4.35	16.68	tr.	0.39	0.26=99.64

B. B. in the open tube and on charcoal becomes dull and magnetic.  $F=4$ . With the fluxes reacts for iron and manganese. Gelatinizes with muriatic acid.

Found in abundance at the O'Neil Mine, Orange Co., N. Y., associated with magnetite and calcite. The mineral is a member of the chrysolite group, and is intermediate between hyaloderite and fayalite.

*Hypochlorite.* See Bismutoferrite.

**224 A. ILSEMANNITE.** *H. Höfer*, *Jahrb. Min.*, 1871, p. 566.

Crypto-crystalline. Color blue-black to black, on exposure becoming blue. Found imbedded in barite. It is soluble in water, giving a deep-blue solution, and leaving a colorless residue of barite. The solution contained on analysis chiefly a molybdate of molybdic oxyd, and yielded on evaporation deep-blue crystals, which were considered to be the salt  $\text{Mo} + 4 \text{Mo}$ , which is also supposed to be the composition of the mineral. Ilsemanite is a product of the decomposition of metallic molybdates, and occurs associated with wulfenite at Bleiberg in Carinthia.

**431 A. IVIGTITE.** *T. D. Rand*, *Proc. Acad. Sci. Philad.*, 1868, 142.

In films and seams in massive cryolite. Granular, approaching micaceous.  $H.=2-2.5$ .  $G.=2.65$ . Color pale yellowish-green to yellow (Rand). Also in gold yellow to pale green radiated elastic plates imbedded in cryolite (Hagemann). Analyses: 1. T. D. Rand (l. c.); 2. 3. G. Hagemann, *Am. J. Sci.*, II. xlvii. 133:

	Si	Al	Fe	Na	K	F	H
1.	36.49	24.09	7.54	16.03	—	0.75	3.42
2. Yellow	40.00	38.47		10.27	1.05	tr.	3.06
3. Green	42.82	27.03	13.06	undet.	undet.	tr.	3.93

The loss in No. 1. exclusive of fluorine, is 11.68 per cent., while the average of Nos. 2 and 3 gives a loss of almost 5 per cent. In the closed tube yields acid water, and B. B. according to Rand fuses easily, while Hagemann states that when free from cryolite it does not fuse. With the fluxes gives iron and silica reactions.

Found with pachnolite and cryolite in the Greenland cryolite. Hagemann's analysis of the green mineral, which he considers the purest variety, gives with the alkalis of No. 2 the oxygen ratio of R,  $\text{Fe}$ , Si and H of 1 : 6 : 8 : 1. Needs further investigation.

**520 A. ISOCASITE.** Isoklas, *F. Sandberger*, *J. pr. Chem.*, II. ii. 125.

Monoclinic. Occurring planes  $I$ ,  $i-i$ ,  $O$ . Planes dull; crystals minute (10 mm. diam.), associated with pseudomorphic crystals 3.7 c. m. long. Habit columnar. Clinodiagonal cleavage perfect.  $H.=1.5$ .  $G.=2.92$ . Lustre vitreous to pearly. Colorless to snow-white. Composition: Var. 1. fresh crystals; 2. altered mineral, by Köttnitz, l. c.:

	P	Ca	Mg	Na	Fe Al	H <sup>(a)</sup>	H <sup>(b)</sup>	Ins.
1.	29.90	49.51	—	—	—	2.06	18.53	—=100.0
2.	34.00	1.00	17.30	9.80	0.36	24.26	9.22	0.18=96.12

(a) at  $100^\circ \text{C}$ ., (b) on ignition.

The fresh crystals give the formula  $\text{Ca}^3 \text{P} + \text{Ca H} + 4 \text{H}$ . Analogous in composition to tagilite, but containing more water.



In the closed tube both varieties give off neutral water. B. B. the fresh mineral glows and fuses. Soluble in muriatic acid.

Found with hornstone and brown-spar on specimens from Joachimsthal, obtained eighty years ago, and now in the Würzburg Museum.

**188 A. JACOBSITE.** *A. Damour, C. R., lxi. 168.*

Isometric, in distorted octahedrons,  $H=6?$  (scratches glass).  $G=4.75$ . Lustre brilliant metallic. Color deep black. Streak blackish-brown. Magnetic.

Composition: R, R, or (Mn Mg) (Fe Mn)

Fe	Mn	Mg
$\frac{4}{3}$ 68.25	24.35	6.41=99.01

As the mineral evolves chlorine feebly when acted upon by muriatic acid, Damour considers a portion of the manganese to exist as Mn, giving for the true composition of the mineral, in correspondence to the spinel formula, Fe 68.25, Mn 4.21, Mn 20.57, Mg 6.41=99.44.

B. B. infusible. It does not lose weight when ignited. With the fluxes reacts for iron and manganese. Soluble in muriatic acid, with a slight evolution of chlorine.

From Jacobsberg, in Nordmark, Sweden, where it occurs associated with white mica and native copper in a crystalline limestone.

**127 A. JULIANITE.** *M. Websky, ZS. G. Ges., 1871, p. 486.*

Isometric. Cubic with octahedral and dodecahedral planes. Also dodecahedral. Planes much rounded.

$G=5.12$ . Very soft. Lustre metallic-adamantine. Color dark, somewhat reddish lead-gray, iron black on exposure. Brittle. Fracture splintery to subconchoidal.

Analysis by Websky (l. c.):

S	As	Sb	Fe	Ag	Cu
26.50	16.78	1.42	0.79	0.54	52.30=98.33

Giving a composition approaching tennantite or enargite. It agrees with the former in crystalline form, but differs in density from both these species.

B. B. Same as tennantite. Found in the Frederick-Julian Mine at Rudelstadt, in Silesia.

**121 A. KLAPROTHOLITE.** Klaprothit, *Petersen and Sandberger, Jahrb. Min., 1868, 415.* Klaprotholite, *G. J. Brush.*

This name is given to the Kupferwismuthertz analyzed by Schneider, and recorded in this Mineralogy under Wittichenite, p. 99, anal. 7. Sandberger gives the following characters:—Orthorhombic, habit in long furrowed prisms. Planes  $I, i-i, m-i$ ;  $I \wedge I=107^\circ$ . Cleavage  $i-i$  very distinct. In twins, composition-face  $I$ . Fracture granular.  $H=2.5$ .  $G=4.6$  approx. (Petersen). Lustre metallic. Color steel-gray inclining to yellow, tarnishing brass-yellow. Streak black. Composition, 3 Cu S + Bi $\frac{1}{2}$  S $\frac{3}{2}$ =S 19.22, Bi 55.54, Cu 25.24=100. The mean of three analyses by Petersen gave, on mineral from the Daniel Mine, S 18.66, Bi 53.87, Cu 23.96, Fe 1.70=98.19. Occurs at many localities in the Black Forest, and distinguished from wittichenite by its distinct cleavage, and in its larger content of bismuth. Klaprotholite is generally associated with a cobalt-tetrahedrite, while wittichenite is usually found with smaltite. The name klaprothite was given to lazulite by Beudant in 1824, we therefore change Petersen's name to klaprotholite.

**483 A. KOCHELITE.** *M. Websky, ZS. G. Ges., xx. 250, 1868.*

Tetragonal? In columnar incrustations passing into rounded, apparently square octahedrons, occasionally showing prismatic planes. Color brownish isabella-yellow to honey-yellow. Translucent. Lustre dull greasy.  $H=3-3.5$ .  $G=3.74$ , taken on 0.1373 grm.

Composition. An imperfect analysis gave Si 4.49, Al 1.41, Cb 29.49, Zr 12.81, Th 1.23, Y 17.22, Ca 2.10, P 0.43, Fe 12.48, H 6.52, Pb? Na? Loss 11.82=100.

In the closed tube yields water, and the mineral turns reddish. B. B. in the forceps fuses only on the edges to a black glass, coloring the flame yellow. With salt of phosphorus reacts for iron, but in R. F. fuses to a clear bead, showing only a faint reaction for uranium. With soda on charcoal yields a yellowish-white enamel, but no metallic globules, although giving a lead coating on the coal. Occurs as an incrustation upon a mixture of titanite iron and crystals of fergusonite in a coarse granite in the Kochelwiesen, near Schreiberhau in Silesia.

The composition is near that of fergusonite, but further investigation is needed. The density is remarkably low for a mineral containing so large a percentage of metallic acids.

**518 A. Kollophan.** This name has been given by Sandberger to a gymnite-like looking substance found with Sombrero guano. It is a tri-basic phosphate of lime with one atom of water, mixed with about 8 per cent. of carbonate of lime.  $G.=2.70$ .  $H.=5$ . J. pr. Chem., II. ii. 129.

**644 A. LAXMANNITE.** *A. E. Nordenskiöld*, Pogg. Ann., cxxxvii. 299, 1869.

Monoclinic.  $C.=69^{\circ} 46'$ .  $a:b:c=1.3854:0.7400:1$ . Occurs in wedge-shaped forms with sharp edges.  $H.=3$ .  $G.=5.77$ . Color dark olive-green to pistachio-green and greenish-gray. Streak pistachio-green. Fracture, crystalline to compact and earthy. Composition ( $\frac{1}{2} Cu - \frac{1}{2} H$ )<sup>2</sup>  $\bar{P}+3$  (Pb, Cu)<sup>2</sup>  $\bar{C}r=Pb$  61.48,  $\bar{C}u$  13.13,  $\bar{C}r$  16.57,  $\bar{P}$  7.83,  $H$  0.99=100. Analyses 1. 2. Nordenskiöld (l. c.):

	$\bar{C}r$	$\bar{P}$	Pb	$\bar{C}u$	$\bar{F}e$	$H$
1.	15.26	8.05	61.26	12.43	1.09	1.31=99.40
2.	16.76	8.57	61.06	10.85	1.28	0.90=99.42

Hermann has reviewed these results (J. pr. Chem., II. i. 447), and called attention to the close correspondence of this species in physical characters with vauquelinite, and also to the fact that the analyses were made on material from the very specimens from which Berzelius obtained the vauquelinite. By assuming that what Berzelius weighed as chromic acid was really phosphate of chromium, the results of the analysis are made to approximate very closely to those of Nordenskiöld; and Hermann believes that laxmannite is probably identical with vauquelinite. But Nordenskiöld shows in his investigation that there is associated with laxmannite a chromate free from phosphoric acid corresponding to the vauquelinite of Berzelius.

Hermann has also analyzed a phospho-chromate from Beresof, to which he gives the name *phosphochromite*, a mineral resembling *laxmannite* in physical characters, but containing

$G.=5.80$	$\bar{C}r$	$\bar{P}$	Pb	$\bar{C}u$	$\bar{F}e$	$H$
	10.13	9.94	68.33	7.36	2.80	1.16=99.72

This mineral occurs in rounded masses of half a pound weight, made up of globular particles, which exteriorly are covered with small tabular crystals with rounded terminations. It would seem possible that this aggregate might be a mixture rather than a distinct species; and this may perhaps also be true in regard to laxmannite. A chromo-phosphate of lead and copper from the same locality was described by John (this Min., p. 631) as early as 1845, but was thought to be an impure vauquelinite.

**554. Lime-Wavellite.** Kalkwavellit, *Kosmann*, Z. G. Ges., xxi. 795 (1869).

This name has been given to a mineral occurring in concentric radiated spherical and hemispherical aggregations, sometimes in acicular crystals, as binding material in phosphorite-breccia; also found botryoidal and reniform.  $G.=2.45$ . Lustre feeble. Color white. Analysis, Kosmann (l. c.):

$\bar{P}$	$\bar{A}l$	$\bar{F}e$	$\bar{C}a$	$\bar{M}g$	$\bar{N}a$	$\bar{K}$	$H$	$\bar{S}i$	$\bar{C}$	Ca Fl
24.10	30.26	0.29	16.16	0.12	3.58	0.89	17.90	3.59	2.78	0.37=100.04

Considering the carbonic acid to exist as carbonate of lime, and assuming the silica combined with the alkalies, Kosmann takes the remainder of the constituents  $\bar{C}a$  12.62,  $\bar{A}l$  30.26,  $\bar{P}$  24.11, and  $H$  17.90=84.88, and averages them up to 100 pts. as follows,  $\bar{C}a$  14.86,  $\bar{A}l$  35.65,  $\bar{P}$  28.39,  $H$  21.09=99.99, from which composition he concludes that the mineral is a *lime-wavellite*. In the closed tube yields water. B. B. fuses on the edges. Decomposed by muriatic acid with separation of gelatinous silica.

Found with phosphorite at Dehrn and Ahlbach. Needs further examination to determine its exact chemical composition.

**213 D. LITHIOPHORITE** (*Breithaupt*). *A. Frenzel*, J. pr. Chem., II. ii. 203 and iv. 353.

This is the substance already noticed by v. Kobell (Ber. Ak. München, Jan. 8, 1870, p. 49) as a lithia manganese ore in an examination of a so-called Asbolan from Saalfeld. Occurs in fine scales, also compact, botryoidal,  $H.=3$ .  $G.=3.65$  (v. Kobell) 3.14—3.36 (Frenzel). Lustre dull to metallic. Color bluish-black. Streak blackish-gray. Composition: 1. 2. C. Winckler, J. pr. Chem., II. iv. 353. 1872.

	Fe	Al	Mn	Cu	Co, Ni	Ba	Li	K	O	H	Ins.
1.	1.48	10.54	55.12	1.74	2.43	2.78	1.23	0.73	10.28	12.64	— =98.96
2.	2.43	15.53	49.87	0.96	0.64 0.30	1.26	1.42	1.50	7.77	15.42	3.08=100.18

with traces of lime and bismuth. G. of No. 1=3.36, both specimens were from Schneeberg, Saxony. In a partial analysis v. Kobell obtained (l. c.)  $\text{Mn}$  54.00,  $\text{Co}$  4.00,  $\text{Cu}$  0.61,  $\text{Al}$  23.00,  $\text{H}$  13.4.

Gives water in the tube. Infusible, colors the flame carmine-red. With the fluxes reacts for manganese; with salt of phosphorus in R. F. gives reactions for copper and cobalt. Soluble in muriatic acid with evolution of chlorine.

Found associated with quartz in many localities in the Schneeberg mining district, also occurs at Sayn, and near Siegen. Supposed to be a product of the decomposition of psilomelane. The large percentage of alumina and its content of lithia distinguish it readily from asbolite and lampadite.

**598 A. Lüneburgite.** C. Nöllner, Ber. Ak. München, 1870, 291.

This name has been applied by Nöllner to a salt from Lüneburg having the following composition:  $\text{P}$  29.8,  $\text{B}$  12.7,  $\text{Mg}$  25.3,  $\text{H}$  32.2=100. It also contains 0.7 Fl. Nöllner gives as formula for this substance (2  $\text{Mg}$ ,  $\text{H}$ )  $\text{P} + \text{Mg B} + 7 \text{H}$ . No physical characters are stated.

**1 A. MALDONITE.** G. H. F. Ulrich, Contrib. to Mineralogy of Victoria, 1870, (pamphlet 32 pp. 8vo.).

In small particles in quartz, cleavage apparently cubical.  $\text{H.}=1.5-2$ .  $\text{G.}=8.2-9.7?$  (made on less than one grain of impure mineral). Color pinkish-white, but tarnishing on exposure to copper-color and then black. Malleable. An assay by C. Newbery showed the composition to be  $\text{Au}$  64.5,  $\text{Bi}$  35.5, or nearly  $\text{Au}^2 \text{Bi}$ . B. B. fuses easily; on charcoal coats the coal yellow and yields a globule of gold.

From Nuggety Reef, Maldon.

**64 A. METACINNABARITE.** G. E. Moore, J. pr. Chem. II. ii. 319 (1870). Am. J. Sci. III. iii. 36.

Amorphous, also found in small apparently isometric crystals, perhaps pseudomorphic.  $\text{H.}=3$ .  $\text{G.}=7.70-7.748$ . Lustre metallic. Color grayish-black. Streak black. Fracture sub-conchoidal, uneven. Very brittle. Composition:  $\text{Hg S}$ . Analyses 1. 2., G. E. Moore (l. c.):

	S	Hg	Fe	quartz
1.	13.79	85.69	0.33	0.26=100.07
2.	13.84	85.89	0.45	0.24=100.42

Blowpipe characters like cinnabar. Occurs at the Redington Mine, Lake Co., California, with cinnabar, quartz and marcasite. It differs from cinnabar in its amorphous character, in color, streak, specific gravity and lustre, while in these respects it is identical with the black artificial mercuric sulphide of the laboratory.

**MILARITE.** A. Kenngott, Jahrb. Min., 1870, 81.

Hexagonal. Occurring form a hexagonal prism with a plane of a hexagonal pyramid on each angle, and a narrow termination of the lateral edges; observed angle over a terminal edge of the pyramid  $144^\circ 46\frac{1}{2}'$  (mean of results), and over a basal edge  $74^\circ 40'$ ; the latter gives for the former, by calculation,  $144^\circ 42'$ .

$\text{H.}=5.5-6$ . Lustre vitreous. Colorless to greenish, resembling the datholite crystals from Bergen Hill. Brittle. B. B. in the closed tube becomes white and gives off water. In the forceps fuses with intumescence to a white blebby glass. In salt of phosphorus slowly but completely soluble to a colorless glass. A partial qualitative analysis gave evidence of the presence of an alkali and besides probably lime. Kenngott considers it a zeolitic hydrous silicate of alumina, lime, and soda, but on uncertain evidence.

Found in Val Milar near Ruäras, Switzerland.

**503. Montebasite.** Des Cloizeaux, C. R. lxxiii. 306, 1247. L. Moissenet, Ann. d. Mines, VI. xx. 1 (1871). F. Pisani, C. R. lxxiii. 1479. F. von Kobell, Ber. Ak., München, Feb. 3, 1872.

This supposed fluo-phosphate from Montebas in France has recently been shown by Pisani and von Kobell to be identical with amblygonite. Des Cloizeaux found it to be triclinic, with two cleavages giving  $105^\circ 44'$ , and in the optical examination the bisectrix of the acute angle was positive, while in the Hebron amblygonite it is negative. Analyses by Moissenet (1), Pisani (2), and v. Kobell (3) afforded:



	F	P	Al	Mn	Ca	Na	Li	Si	Ign.	
1.	26.50	21.80	38.20	—	2.00	6.70	6.50	2.25	0.60=104.55.	M.
2.	8.20	46.15	36.32	0.40	—	2.58	8.10	—	1.10=102.85.	P.
3.	9.00	45.91	35.50	—	0.50	5.30	6.70	0.60	0.70=104.21.	K.

Pisani's and v. Kobell's results give essentially the composition of amblygonite as analyzed by Rammelsberg, and as the physical and pyrognostic characters are also those of amblygonite, there can be no question as to the identity of the Montebbras mineral with this species.

MONZONITE. *F. v. Kobell*, Ber. Ak. München, 6 May, 1871.

Compact. H.=6. G.=3. Color light grayish-green. Translucent on thin edges. Fracture splintery to sub-conchoidal. Resembles green hornstone. Analysis by v. Kobell (l. c.):

Si	Al	Fe	Mg	Ca	Na	K	H
52.60	17.10	9.00	2.10	9.65	6.60	1.90	1.50=100.45

Giving the oxygen of R, H, and Si as 1 : 1 : 3.5.

B. B. fuses at 3 to a lustrous grayish-green glass. Not decomposed by acids after fusion. Not attacked by muriatic or sulphuric acids. Soluble in concentrated phosphoric acid.

Found on the Monzoni Mt. in the valley of Fassa, Tyrol. A microscopic examination of a thin plate of the mineral showed it to be homogeneous.

*Næsumite*. *C. W. Blomstrand*, Öf. Ak. Stockh., 1868, p. 197.

A chalk-white mineral, from Näsund, Sweden. It occurs mixed with the phosphate attacolite. After calculating out the phosphoric acid as Al P, the analysis gave Si 50.91, Al 27.86, Fe 1.36, Mn 0.36, Ca 13.82, H 4.39=98.70. The oxygen ratio of R, H, Si, H is as 1 : 3 : 7 : 1. It may perhaps be classed near fahnlunite.

510. NADORITE. *Flajolot*, C. R., lxxi. 237, 406. *F. Pisani*, C. R., lxxi. 319; *Des Cloizeaux*, Ann. d. M., VI. xx. 32, 1871.

In flattened tabular orthorhombic crystals,  $I \wedge I = 132^\circ 51'$ . Cleavage macrodiagonal, very easy. H.=3. G.=7.02. Lustre resinous to adamantine. Color smoky-brown to brownish-yellow. Streak yellow. Translucent. Analyses: 1. Pisani (l. c.); 2. Flajolot (l. c.):

	Sb	Pb	O	Cl
1.	31.24	51.89	8.14	9.00=100.27
2.	32.25	51.60	8.00	8.85=100.70

Pisani considers the mineral to correspond to the formula  $\text{Sb Pb} + \text{Pb Cl}$ , while Flajolot looks upon it as a compound of oxychlorid of antimony with oxyd of lead. Pisani suggests its analogy with mendipite  $2 \text{ Pb} + \text{Pb Cl}$ .

In the closed tube decrepitates and gives a white sublimate. B. B. on charcoal yields an antimony coating and a globule of metallic lead. Added to a bead of salt of phosphorus saturated with copper gives the blue coloration of the flame due to chlorid of copper. Soluble in muriatic acid; also in nitric acid diluted with tartaric acid.

From Djebel-Nador, in the province of Constantine, Algiers.

214 A. NAMAQUALITE. *A. H. Church*, Jour. Chem. Soc., II., viii. 1 (1870).

In silky fibres and thin layers. H.=2.5. G.=2.49. Lustre silky. Color pale-blue. Transparent to translucent. Analysis by Church (l. c.):

Al	Cu	Mg	Ca	Si	H
15.29	44.74	3.42	2.01	2.25	32.38=100.09

Giving the oxygen ratio of R, H and H as 4 : 3 : 11, or  $4 \text{ R H} + \text{Al H}^3 + 4 \text{ H}$ .

In the closed tube gives off water and turns black. B. B. reacts for copper.

From Namaqualand, S. Africa. It is analogous in composition to hydrotalcite (p. 178).

146 A. NANTOKITE. An anhydrous sub-chlorid of copper from Nantoko in Chile. Occurs in a copper vein with atacamite and oxydized ores at the surface, while lower down in the vein this anhydrous chlorid is found with chalcopryrite and chalcocite. The mineral is white, resembles cerussite in physical characters. It oxydizes on exposure to the atmosphere, and is converted into atacamite. W. Hermann considers all atacamite the product of the alteration of nantokite (*Breithaupt* in B. and H. Ztg. xxvii. 3). 1872.

**247 D. NIGRESCITE.** *F. Hornstein*, ZS. G. Ges., 1867, 342.

Amorphous. Fracture uneven and splintery.  $H.=2$ .  $G.=2.845$ . Color, when fresh, apple-green; on exposure becomes gray to black; opaque and earthy, and, on drying, as light as wad. Loses 16.5 per cent. hygroscopic water.

Analysis:

Si	Al	Fe	Mn	Mg	Ca	H
$\frac{3}{2}$ 52.29	5.14	15.71	0.23	18.11	2.59	6.29=100.36

Perhaps the product of the alteration of a magnesia-iron augite or amphibole.

Found in rounded masses in basalt, at Dietesheim, in the valley of the Maine.

*Orileyite.* *D. Waldie*, Proc. Asiatic Society, Bengal, p. 279. September, 1870.

Massive.  $H.=5.5$ .  $G.=7.34-7.42$ . Color steel-gray, on fresh fracture with purplish tint. Lustre metallic. Streak dark-gray. Analysis, *D. Waldie* (l. c.):

As	Sb	Cu	Fe	X	Insol.
38.45	0.54	12.13	42.12	6.19	0.12=99.55

X, oxydized matters soluble in dilute muriatic acid = Cu 1.21, Fe 1.97, Pb 1.89, As 1.12 = 6.19. B. B. in the closed tube yields no arsenic. Soluble in nitric acid.

From Burmah, but exact locality not known. Needs further investigation.

*Osbornite.*—This name has been given by Maskelyne to small gold-yellow octahedrons occurring in augite in a meteorite from Busti, India. It is supposed to be an oxysulphid of titanium and calcium.

*Phosphorchromite.* See Laxmannite.

**374. Plumbalophane.** A name given by Bombicci to a plumbiferous allophane from Monte Vecchio in Sardinia. Occurs in small stalactitic cylinders, rough and opaque on the surface, but interiorly glassy. Color grayish-yellow with a white streak.  $H.=2.5$ .  $G.=1.9$ . Analysis gave Si 23.8, P 2.6, Al 32.9, Fe 0.5, Ca 2.4, H 35.2, Pb, Mg and alkalis 2.5=99.9 (*Atti della Sc. Ital. di Sc. Nat.* xi., in *Jahrb. Min.* 1868, p. 750.

**40 C. POLYARGYRITE.** *F. Sandberger*, *Jahrb. Min.*, 1869, 311. *T. Petersen*, *Pogg. Ann.*, cxxxvii. 386. 1869.

Isometric. Observed planes 1 *O i, m-m*. Cleavage cubic.  $H.=2.5$ .  $G.=6.974$ . Lustre metallic. Color iron-black to dark blackish-gray. Streak black to blackish-gray. Malleable, flattening more under the hammer than argentite.

Composition: 12 Ag S + Sb<sub>2</sub>S<sub>3</sub>=Ag. 78.16, Sb 7.37, S 14.47=100.00.

Analysis, *Petersen* (l. c.):

S	Sb	Ag	Pb	Fe	Zn
$\frac{2}{2}$ 14.78	6.98	76.70	tr.	0.36	0.27*=99.09

\* Corrected.

B. B. on charcoal fuses easily to a black globule, giving off antimony fumes, and yielding a brittle globule of silver. Soluble with difficulty in nitric acid with separation of sulphur. Fuming acid dissolves it readily with separation of antimonate of silver.

Occurs at Wolfach in Baden.

The mineral is between argentite and pyrargrite in composition. If homogenous it would be classified chemically near polybasite; but its isometric form, and the fact that in another analysis *Petersen* found 78.85 Ag, suggests that it may possibly be a mixture.

**624. PUCHERITE.** *A. Frenzel*, J. pr. Chem., II. iv. 227, 361. 1872

Orthorhombic. Observed planes *I, O, 1- $\bar{n}$ , m-u*. Cleavage basal.  $H.=4$ .  $G.=5.91$ . Lustre vitreous adamantine. Color reddish-brown. Streak yellow. Translucent to opaque. Composition: Bi  $\bar{V}$ =Bi 71.67  $\bar{V}$  28.33=100. Analyses, 1. 2. *Frenzel* (l. c.):

	$\bar{V}$	Bi
1.	27.31	73.39=100.70
2.	27.07	72.93=100 —

In the closed tube decrepitates. B. B. on charcoal fuses and gives a coating of bismuth-oxyd, with soda yields a globule of metallic bismuth. With salt of phosphorus a chrome-green bead in R. F. becoming light yellow in O. F. (vanadium). Soluble in muriatic acid with evolution of chlorine to a deep-red solution, which on dilution becomes green and deposits a yellow basic chlorid.

Named pucherite from the locality, the Pucher Mine, Schneeberg, Saxony. Found associated with bismite and asbolite.

**218 E. RABDIONITE.** *F. von Kobell*, Ber. Ak. München, January 8, 1870.

Scalacritic, in columnar or rod-like forms. Very soft, soiling the fingers.  $G.=2.80$ . Lustre dull, after rubbing is greasy to submetallic. Color black. Streak dark-brown. Composition:

Fe	Mn	Al	Cu	Mn	Co	H
45.00	13.00	1.40	14.00	7.61	5.10	13.50=99.61

The oxygen ratio of R :  $\bar{R}$  : H is 1 : 3 : 2, and v. Kobell writes the formula  $(\bar{Cu}, Mn, Co)(\bar{Fe}, \bar{Mn}) + 2H$ .

In the closed tube gives neutral water. B. B. fuses at 3 to a steel-gray, magnetic-globule, and colors the flame green. With borax gives a cobalt blue bead. Soluble in muriatic acid with evolution of chlorine, giving an emerald-green colored solution.

From Nischne Tagilsk in Ural. The mineral is near asbolite (p. 181), but differs from it in chemical composition, in containing a large percentage of iron, and in being easily fusible.

**163 A. RALSTONITE.** *G. J. Brush*, Am. J. Sci., III. ii. 30. July, 1871.

Isometric. Habit octahedral. Observed planes 1, *O* (this Min. fig. 7, p. 21).  $H.=4.5$ .  $G.=2.4$  (on 25 milligrams). Composition, a hydrous fluorid of aluminum, with possibly small quantities of calcium and sodium.

In the closed tube whitens, yields water at first, then a copious white sublimate which etches the tube. The water reacts acid. B. B. on charcoal a faint white sublimate. In the forceps whitens, colors the flame yellow, but does not fuse. With cobalt solution gives a deep blue. In salt of phosphorus dissolves completely to a colorless bead in both flames. Soluble with effervescence in a carbonate of soda bead. Decomposed by sulphuric acid with evolution of fluohydric acid.

Occurs with cryolite and thomsenolite at Arksut Fiord, Greenland.

*Redondite*. A name given by C. U. Shepard to a hydrous phosphate of alumina and iron from Redonda, W. I. Found in nodular aggregations. Translucent to opaque. Color grayish to yellowish white.  $H.=3.5$ .  $G.=1.90-2.07$ . Specimen analyzed contained 8.8 per cent. Si. 40.192  $\bar{P}$  and 24.73  $\bar{H}$  (Am. J. Sci., II. i. 96). An earlier analysis gave  $\bar{P}$  43.20, Fe 14.40, Al 16.60, H 24.00, Si 1.60, Ca 0.57=100.37, contained also traces of S, Na, Cl, and Mg. B. B. infusible. Heated with solution of cobalt gives a deep blue color (Am. J. Sci., II. xlvii. 428).

**422. Restormelite.** A name given by A. H. Church (Jour. Chem. Soc., II. viii. 166) to a massive grayish-green agalmatolite-like mineral from Restormel Mine in Cornwall.  $H.=2$ .  $G.=2.58$ . Mean results of analysis gave Si 45.66, Al 35.10, Fe 1.11, Mg 0.85, K 2.30, Na 4.39, H 11.68=101.69. This composition is near that given by Lehnt and Blythe for killinite (anal. 29 and 30, under pinite, p. 481). Church does not consider the mineral worthy to rank as a distinct species, but speaks of it as an "immature kaolinite."

**261 A. ROEPPERITE.** Iron, manganese, zinc, chrysolite. *W. T. Roepper*, Am. J. Sci., II. i. 35. Roepperite, *G. J. Brush*, 1872.

Orthorhombic, observed planes  $i-\bar{2}$ ,  $i-\bar{1}$ ,  $1-\bar{1}$ ,  $i-\bar{1}$ ,  $1-\bar{1}$ ,  $1-\bar{4}$ , *O*, 2-2,  $i-\bar{2} \wedge i-\bar{2}$  (over  $i-\bar{1}$ )  $130^\circ$ ,  $i-\bar{2} / i-\bar{2}=115^\circ$   $1-\bar{1} / 1-\bar{1}=77^\circ$ . Cleavage in three directions rectangular, *O* and  $i-\bar{1}$  eminent,  $i-\bar{2}$  splintery.  $H.=5.5-6$ .  $G.=3.95-4.08$ . Lustre on cleavage planes vitreous to subadamantine. Color dark-green to black, mottled. In thin splinters translucent and pale-yellow color. Streak yellow to reddish-gray. Slightly magnetic. Composition: R<sup>2</sup> Si. R = Fe, Mn, Zn and Mg. Analyses 1, 2, 3., W. T. Roepper (l. c.):

	Si	Fe	Mn	Zn	Mg	Insol.*
1. Cryst.	30.76	33.78	16.25	10.96	7.60	—=99.35
2. Cryst. $\frac{2}{2}$	30.23	35.52	16.91	10.68	5.63	1.04=100.01
3. Mass. $\frac{2}{2}$	30.54	34.78	17.74	9.48	6.09	2.02=100.65

\* Spinel.

B. B. fuses with difficulty on the thin edges to a black slag. With the fluxes reacts for iron, manganese, and silica; on charcoal with soda gives a zinc coating. Gelatinizes with acids readily and completely, leaving sometimes a bright-green residue of spinel.

Occurs at Stirling Hill, Sussex Co., N. J., with willemite, franklinite, jeffersonite, and spinel; also found at Franklin Furnace with gahnite.



**393 A. Reissite.** A name given by K. v. Fritzsche to a zeolitic mineral from Santorin. According to Hessenberg (his Min. Notizen, No. 9, p. 22) it is orthorhombic with the axial relation for the brachydiagonal, macrodiagonal, and vertical axis. 0.4231 : 1 : 0.2866. Observed planes *I*, *i-i*, 1- $\bar{1}$ , 2-2. Cleavage brachydiagonal. Lustre vitreous. Colorless to white. Fusible with intumescence to a blebby enamel. Gelatinizes with acids more readily after fusion than before. The solution contains lime and alkalies. Hessenberg considers it probable that reissite is identical with Breithaupt's species monophane, and distinct from epistilbite.

**125. Rionite.** A name given by Brauns to a bismuth-tetrahedrite from Cremenzen, Einsiedelthal in Wallis Canton, Switzerland. It has a conchoidal fracture, an iron-black color, black streak, and greasy-metallic lustre. An analysis gave S 29.10, As 11.44, Sb 2.19, Bi 13.07, Cu 37.52, Ag 0.04, Fe 6.51, Co 1.20 = 101.07. Found associated with chalcocypirite. It is worked as an ore of bismuth. The composition places it near annivite, p. 103. (T. Petersen in Jahrb. Min., 1870, 590).

The name *Rionite* was used formerly for a supposed selenid of zinc, described by Del Rio, and *Riolite* for a supposed selenid of silver as well as the preceding, but both names have been dropped from the science, the material on which they were founded being only a mixture.

**807 A. ROSTHORNITE.** H. Höfer, Jahrb. Min., 1871, p. 561.

In lenticular masses in coal. G. = 1.076. Lustre greasy. Color brown, with garnet-red reflections: in thin splinters wine-yellow. Composition:  $\text{C}_{24}\text{H}_{10}\text{O}$ . Analysis by Mitteregger (l. c.):

	C	H	O
$\frac{2}{2}$	84.42	11.01	4.57 = 100.00

At 96°C. commences to melt to a viscous brownish-red mass, which at 160° gives off bubbles and at 205° white fumes, heated to 225° the evolution of gas ceases, leaving a thin dark purplish-red fluid. Insoluble in dilute nitric acid as also in potash or alcohol. Slightly soluble in warm ether and entirely so in warm oil of turpentine. Completely soluble in benzole at ordinary temperatures. From Sonnberge, Carinthia. Resembles jaulingite in physical characters, while it is near euosmite in chemical composition.

**499. SARCOPSIDE.** Sarkopsid, M. Websky, ZS. G. Ges., xx. 245, 1868.

Monoclinic? occurring in irregular ellipsoids, sometimes in distorted six-sided plates.

H. = 4. G. = 3.692–3.730. Lustre glistening to silky and greasy. Color, on fresh surface, flesh-red to lavender-blue. Translucent in thin splinters. Streak straw-yellow, some grains give a green color. Composition:  $4\text{R}^3\text{P} + (\text{RFl} + \text{RFl})$  Websky:

	P	Fe	Fe	Mn	Ca	H	Fl
$\frac{2}{2}$	34.73	8.83	30.53	20.57	3.40	(1.64)	undet.

In the closed tube gives water which reacts for fluorine, turns dark-brown and assumes a sub-metallic lustre. Fuses very easily, may be melted to a bead on platinum wire, and this imparts a blue-green color to the outer flame. With the fluxes reacts for iron and manganese, and fused with bi-sulphate of potash in a closed tube reacts for fluorine, coloring brazil-wood paper and etching the tube. Soluble in dilute muriatic and sulphuric acids.

Occurs with vivianite and hureaulite in a granite vein on a ridge between Michelsdorf and the valley of the Mühlbach in Silesia. This mineral corresponds so closely to triplite (p. 543) in chemical composition and pyrognostic characters, as also in density and hardness, as to make it exceedingly probable that it may be a variety of that species.

**163 B. SELLAITE.** Strüver, Atti della R. Accad. di Torino, iv. 1868, 35.

Tetragonal, *I* on 1 = 123° 30', *i-i* on  $i-3$  161° 34'. Cleavage parallel to *I* and *i-i* perfect. H. = 5. G. = 2.972. Lustre vitreous. Fracture conchoidal. Colorless. Transparent. Composition:  $\text{MgFl}^2$ ? In small fragments melts in the flame of a candle with intumescence. Insoluble in water, also in acids, except concentrated sulphuric acid, with this it evolves fluohydric acid. The sulphuric solution gave 39.64 pr. ct. of magnesia, which with the other chemical and physical properties of the mineral leads Strüver to consider the mineral a fluorid of magnesium analogous to fluorite in composition.

Found with anhydrite at Geibroula in Piedmont.

**659 A. SIMONYITE.** G. Tschermak, Ber. Ak. Wien, November Heft, 1869.

Monoclinic. Ratio of orthodiagonal, clinodiagonal, and vertical axis 1 : 0.7453 : 0.5041; in-

clination of axis= $C=101^{\circ} 29'$ . Observed planes  $I, O, i-2, 1, 1-i$ .  $I \wedge I=105^{\circ} 15'$ ,  $O \wedge 1-i=146^{\circ} 28'$ ,  $O \wedge 1=142^{\circ} 5'$ ,  $I \wedge i-2=160^{\circ} 34'$ . Crystals minute. Also massive.  $H.=2.5$ .  $G.=2.244$ . Color of the massive mineral bluish-green to reddish-yellow. The crystals sometimes colorless and transparent. Taste faint, saline, and bitter. Unaltered on exposure to the air.

Analysis: G. Tschermak (l. c.):

$\bar{S}$	Mg	Na	H
47.17	12.65	18.86	21.82=100.50

This yields the oxygen ratio for  $\bar{R} : \bar{S} : \bar{H}$ ,  $1 : 3 : 2$  or  $\bar{R} \bar{S} + 2\bar{H}$ , the same as the formula given for Bleedite (p. 643), which mineral it also resembles in crystalline form. Tschermak remarks that simonyite differs from bleedite in not efflorescing on exposure to air, and losing only a portion of its water (4.90 pr. ct.) on being heated for two hours in a water-bath. Occurs at Hallstadt.

A mineral of the same composition and form, likewise unalterable in air, found at Stassfurt, has been referred by Groth and Hintze to bleedite, these authors assuming that the efflorescence of bleedite, noticed by earlier observers, was due to mixture with some efflorescent salt. ZS. G. Ges. 1871, 870.

*Stibiotriargentite, Stibiohexargentite*, see Dyscrasite.

**595 A. SUSSEXITE.** G. J. Brush, Am. J. Sci., II. xlv. 140, 240, 1868.

In fibrous seams or veins.  $H.=3$ .  $G.=3.42$ . Lustre silky to pearly. Color white with a tinge of pink or yellow. Translucent.

Composition:  $(Mn, Mg)^2 \bar{B} + H$  or  $(\frac{2}{3} (Mn, Mg) + \frac{1}{3} H)^3 \bar{B}$ . Analysis: G. J. Brush (l. c.):

$\bar{B}$	Mn	Mg	H
31.89	40.10	17.03	9.59=98.61

In the closed tube darkens in color and yields neutral water. If turmeric paper is moistened with this water, and then with dilute muriatic acid, it assumes a red color (boric acid). In the forceps fuses in the flame of a candle ( $F=2$ ), and B. B. in O. F. yields a black crystalline mass, coloring the flame intensely yellowish-green. With the fluxes reacts for manganese. Soluble in chlorhydric acid.

Found on Mine Hill, Franklin Furnace, Sussex Co., N. J., associated with franklinite, zincite, willemite, and other manganese and zinc minerals. This species approaches in composition the mineral saibelyite.

**TALCOSITE.** G. H. F. Ulrich, Contributions to the Mineralogy of Victoria, Melbourne, 1870 (pamphlet of 32 pp. 8vo.).

In thin seams and threads with scaly structure, the scales apparently rhombic plates.  $H.=1-2$ .  $G.=2.46-2.5$ . Lustre pearly. Color silver-white, faint greenish, or yellowish. Scales flexible but not elastic. Resembles talc. Analyses 1, 2 by C. Newbery (l. c.):

	Si	Al	Cr	Fe	Mg	Na	H
1.	49.01	45.10	tr.	tr.	tr.	tr.	4.98=99.09
2.	49.07	46.96	tr.	tr.	tr.	tr.	3.73=99.76

The oxygen ratio of anal. 1 for  $\bar{H}$ ,  $\bar{Al}$ ,  $\bar{Si}$  is  $1 : 5 : 6$ . This mineral is perhaps related to selwynite, with which it occurs, and also to westanite (described in this appendix).

*Obs.* From Mount Ida near Heathcote, Victoria.

*Tellurismuthsilber.* C. Rammelsberg, ZS. G. Ges., xxi. 81.

Granular.  $G.=7.893$ . Lustre metallic. Color gray, tarnished. Cuts with a knife, but sufficiently brittle to be readily pulverized. Composition: analysis by Rammelsberg, l. c.:

S	Te	Bi	Ag	Cu
3.32	24.10	48.50	23.35	tr.=99.27

Rammelsberg gives the relation of  $S : Ag : Bi : Te$  as  $1 : 2.08 : 2.24 : 1.8$ , but thinks it may be more correctly expressed by  $1 : 2 : 2 : 2$ , as the bismuth obtained was not free from tellurium, and the formula of this new tellurium mineral may then be written  $Ag^2 S + Bi-Te^2$  or  $Ag^2 S + 2 Bi-Te^2$ ?. He also questions whether the mineral may not be a mixture of argentite and tellurid of bismuth, or of native silver and sulphotellurid of bismuth, but finds nothing in the physical properties of the mineral to indicate a mixture.

*Obs.* From Sierra de Tapalpa, Mexico.

**817 A. TRINKERITE.** *G. Tschermak*, J. pr. Chem., II. ii. 258, and Jahrb. G. Reichs., 1870, xx. 279.

Compact and amorphous.  $H.=1.5-2$ .  $G.=1.025$ . Lustre greasy. Color hyacinth-red to chestnut-brown. Transparent to translucent. Analysis, 1. Hlasiwetz (l. c.); 2. Niedzwiedzki, Jahrb. Min., 1871, 641:

	C	H	S	O	Ash
1. Carpano	81.1	11.2	4.7	3.0	None=100
2. Gams	81.9	10.9	4.1	3.1	—=99.0

Fuses at  $168^{\circ}-180^{\circ}\text{C.}$ , at a higher temperature gives off choking fumes. Insoluble in water, and only slightly in alcohol and ether. Soluble in hot benzole.

Occurs in large compact masses in brown coal at Carpano near Albona in Istria; also found at Gams near Hieflau in Styria. Resembles in composition the tasmanite of Church (p. 746).

**573 B. TRÖGERITE.** *A. Weisbach*, Jahrb. Min., 1871, 870.

Monoclinic, in thin tabular crystals. Cleavage perfect, parallel to the broad tabular plane.  $G.=3.3$ . Lustre on the cleavage-plane pearly. Color lemon-yellow. Composition,  $\frac{1}{3}\text{As}^2 + 20\text{H}$  (Winckler). No analysis is given. Occurs with walpurgite and other uranium minerals at the Weisser Hirsch Mine in Neustädte near Schneeberg, Saxony.

**URANOTIL.** *E. Boricky*, Jahrb. Min., 1870, 780.

Orthorhombic, in acicular crystals. Occurring form *I*, *i-i*, *m-i*; angle of prism *I* about  $164^{\circ}$  (Zepharovich). In radiated or stellated groups. Cleavage probably basic.  $G.=3.9595$ . Color lemon-yellow. Streak lighter. The mean of three analyses gave Boricky:

Si	U	Al Fe	Ca	P	H
13.78	66.75	0.51	5.27	0.45	12.67=99.43

Giving a composition near that of uranophane (p. 805). It also resembles it in crystalline form, the angle of prism *I* of uranophane  $146^{\circ}$ , giving  $162^{\circ}$  for the prism *i-2*.

B. B. turns black. Soluble in warm muriatic acid with separation of floccy silica.

Found with fluorite, uranite, and quartz at Wösendorf, Bavaria.

**622 B. VANADIOLITE.** *Hermann*, J. pr. Chem., II. i. 445.

Form not determined. Occurs in small crystals, partly in druses. Color dark-green, almost black, in small fragments dark emerald-green. Streak grayish-green. Lustre vitreous, brilliant.  $G.=3.96$ . Analysis gave

Si	Al	Fe	Ca	Mg	V
15.61	1.10	1.40	34.43	2.61	44.85=100.00

which Hermann considers as representing a compound of three atoms of augite, and one of subvanadate of lime. He gives for this the formula  $3\text{R Si} + \text{Ca}^6 (\text{VO}^1 + 2\text{VO}^2)$ . B. B. fuses to a black slag with cauliflower-like intumescences. With salt of phosphorus gives a dark-green bead, and a silica skeleton. Decomposed on fusion with a mixture of carbonate of soda and nitre. From Sludänka near Lake Baikal associated with lavroffite.—A substance containing as this does over 70 per cent. of a vanadate, with the balance a silicate corresponding to augite can scarcely be looked upon as a homogeneous simple mineral. It is here classed with the vanadates.

**573 A. WALPURGITE.** Walpurgin, *A. Weisbach*, Jahrb. Min., 1871, 870.

Monoclinic, in thin scaly crystals.  $G.=5.8$ . Lustre adamantine to greasy. Color pomegranate and wax-yellow. Composition  $\frac{1}{3}\text{As} + 5\text{H}$  in which  $\text{R}=\frac{5}{6}\text{Bi} + \frac{1}{6}\text{U}$  (Winckler). No analysis is given. Occurs with trögerite and other uranium ores at the Weisser Hirsch Mine in Neustädte near Schneeberg, Saxony.

**323 A. WESTANITE.** *C. W. Blomstrand*, Gef. Ak. Stockh., 1868, p. 197, in J. pr. Ch., cv. 341.

In radiated crystalline masses, sometimes in prismatic crystals.  $H.=2.5$ . Color brick-red. An analysis gave:

Si	Al	P	Fe	H
(42.53)	51.14	1.15	1.01	4.17=100.00
42.91	51.92	1.56	—	—



This composition is near wörthite, a hydrous fibrolite, but it differs from that mineral in inferior hardness.

B. B. swells up; infusible and turns white. Not acted upon by acids.

Associated with pyrophyllite at Westana, Sweden.

**601 A. WINKWORTHITE.** *H. How*, Phil. Mag., April, 1871.

In imbedded nodules, crystalline on fracture. Glistening. Colorless to white. Translucent. H.=2-3. Composition: analyses 1. 2., H. How, l. c.:

	Si	B	S	Ca	H
1.	3.31	(10.13)	36.10	31.66	18.80=100
2.	4.98	(14.37)	31.51	31.14	18.00=100

In the closed tube gives water. B. B., decrepitates and fuses readily to a clear bead, coloring the flame green; on continued blowing froths, becomes opaque and no longer shows the green coloration.

Found in gypsum at Winkworth, Nova Scotia. How considers No. 1 to be represented by 11 Ca, 1 Si, 9 S, 3 B and 20 H, while No. 2 is the same with substitution of 8 S and 4 B. He suggests that the mineral is intermediate between selenite and howlite. May it not be a mixture?

**92 A. WOLFACHITE.** *F. Sandberger*, Jahrb. Min., 1869, 313.

*T. Petersen*, Pogg. Ann. cxxxvii. 397. Orthorhombic, in small crystals coating niccolite. Observed planes  $\bar{1}, n\bar{1}$ . H.=5.5. G.=6.372. Lustre metallic. Color silver-white to tin-white. Streak black. Analysis by Petersen (l. c.):

S	As	Sb	Pb	Ag	Fe	Ni	Co, Cu, Zn
14.43	38.46	13.17	1.32	0.12	3.71	29.53	traces=100.74

The lead and silver were believed to be due to a small amount of intermingled galena and dyscrasite. The results give the formula  $\text{Ni S}^2 + \text{Ni (As Sb)}^2$  exactly the same as given for the isometric corynite (p. 74), showing this compound to be dimorphous. Corynite has a lower density (5.95-6.03) and less hardness (4.5-5.). The pyrognostic characters are the same for both minerals and both are soluble in nitric acid. From Wolfach in Baden.

**830 E. Wollongongite.** *B. Silliman*, Am. J. Sci., II. xlviii. 85.

This name has been given provisionally to a hydro-carbon from New South Wales. Occurs in cubical blocks, without lamination. Fracture broad conchoidal. Color greenish to brownish-black. Lustre resinous. Translucent in thin shavings, showing under the microscope an amber-yellow light.

Alone in the tube does not melt but decrepitates and gives off oil and gas. Ignites readily and yields, when heated out of access of air, 82.5 volatile matter, coke 6.5, and when burned 11.0 per cent of ash. Insoluble in ether and benzole, but slightly acted upon by bi-sulphid of carbon.

**550 A. ZEPHAROVICHITE.** *E. Boricky*, Sitzb. Ak. Wien, lix. 593, 1869.

Crystalline to compact, horn-like in aspect. H.=5.5. G.=2.37. Color greenish, yellowish or grayish-white. Translucent. Fracture conchoidal. Composition:

	P	Al	Fe	Ca	Mg	H	Quartz
1.	35.56	29.77	—	1.07	0.41	26.70	5.46=98.97
2.	37.46	28.44	—	0.54	tr.	26.57	6.05=99.06
3.	37.80	29.60	0.85	1.38	—	28.98	0.46=99.07

Nos. 1 and 2 contained intermingled wavellite, and No. 3 an earthy gibbsite. Boricky thinks the analyses prove the mineral to be essentially a phosphate having the formula  $\text{Al P} + 6\text{H}$ , and that in analysis 2 this phosphate is mixed with  $\frac{1}{17}$  of wavellite, while in No. 3 is associated with  $\frac{1}{5}$  of gibbsite and  $\frac{1}{3}$  of tribasic phosphate of lime. The formula  $\text{Al P} + 6\text{H}$  differs from Callainite (p. 572) only in containing 1 atom more of water, and analysis 2, after deduction of the 6.04 of quartz, gives P 40.28, Al 30.57, Ca 0.58, H 28.56, a result which approaches the figures given by Damour in his analysis of callainite.

Occurs in sandstone at Trenic in Bohemia.

## 2. Notes on a few previously described species.

**198. Brookite.** A. Schrauf announces that his recent crystallographic studies have proved brookite to be monoclinic and isomorphous with wolframite (Jahrb. Min., 1871, 163).

**636. Caledonite.** Schrauf has found this species to be monoclinic in crystallization. He makes  $a \wedge m = 132^\circ 32'$ , and  $a \wedge c = 90^\circ 30'$ ,  $a$ ,  $m$ ,  $c$ , being the planes so lettered in Miller's Mineralogy, and corresponding,  $a$  to  $i\bar{i}$ ,  $m$  to  $I$ , and  $c$  to  $O$ , in this work. (Jahrb. Min., 1871, 374.)

*Ephesite*, see Lesleyite below.

**24. Diamond.** P. v. Jeremejew has discovered minute crystals of diamonds irregularly distributed through plates of xanthophyllite from the Schischimskian Mountains near Slatoust. They are readily recognized when magnified 30 diameters, and with 200 diameters their crystalline form is seen to be that of the hexa-tetrahedron  $3\frac{1}{2}$  combined with the tetrahedron, the first four being distinctly convex, while the tetrahedral plane is flat (like fig. 59 p. 21, except that there are also small flat tetrahedral planes). Most of the crystals are colorless. They are symmetrically disposed in their matrix, their trigonal intermediate axes being vertical to the foliation of the xanthophyllite. The green plates of this mineral, nearest the rounded masses of the talcose slate and serpentine enclose unusually large numbers of them and they are likewise found in the two rocks themselves. Jahrb. Min., 1871, p. 275 in Am. J. Sci., III. iii. 57.

*Lesleyite.* The mineral named lesleyite by I. Lea (see p. 800) has been analyzed by S. P. Sharples (Am. J. Sci., II. xlvii. 319) and J. L. Smith (ib. xlviii. 254). Sharples examined two varieties, one white (anal. 1), and the other red (anal. 3). Smith analyzed the white mineral (anal. 2).

	Si	Al	Fe	Ca	Na	K	H
1 white, 33.59	55.41	tr	—	tr	7.43	4.30=100.73	
2 " 31.18	55.00	—	0.45	1.20	7.28	4.80=99.91	
3 red, 47.00	33.27	2.84	—	—	9.97	6.71=99.79	

The analysis of the red variety was made under Sharples's direction by C. W. Roepper. It is an entirely different substance from the white mineral, and was properly referred to pinite by Sharples.

Smith compares the composition of the white variety with that of his ephesite (see Min., p. 507) of which he gives the following new analysis.

	Si	Al	Ca	Na	K	H
Ephesite	30.70	55.67	2.55	5.52	1.10	4.91=100.45

There is also a very close correspondence in the physical as well as in the chemical characters of the two minerals, and they are evidently closely related. Lesleyite is found associated with diaspore and both minerals have a peculiarity in regard to their hardness that suggests a want of homogeneity. They are easily scratched with a knife, but they both contain particles which scratch topaz. Under the magnifier they both present glistening scales which are soft and apparently micaceous. It is evident that the minerals are mixtures of corundum and probably diaspore with a mica similar to the damourite found at the lesleyite locality; and that the foliated soft mineral is damourite or a hydrous mica near that species.

*Pattersonite.* This substance, classed temporarily under the mica group in the supplement to this mineralogy (p. 801), has been analyzed by S. P. Sharples with the following results (Am. J. Sci., II. xlvii. 309).

Si	Fe	Al	Mg	Na Li	K	H
30.20	14.88	20.55	1.28	tr	11.35	11.73=89.99

The potash is stated to have been determined by the difference (loss), but the analysis foots up, exclusive of the potash, only 78.64 leaving 21.36 for potash instead of 11.35. This large error runs through the calculated oxygen ratios, and hence is not typographical. In view of it, the analysis leads to no satisfactory conclusion. The percentages of silica, iron, alumina and water are very near those of prochlorite.

463. *Sclerynite*. Ulrich now regards this species as belonging to the *pinite* group (Contrib. Min. Victoria, p. 24).

98. *Sylvanite*. Schrauf's recent crystallographic researches makes this species orthorhombic in crystallization. He says that he has observed the twins described by Kokscharof; and that the angles and planes are given rightly by Miller; and that he has observed 17 new planes. (Jahrb. Min., 1871, 394.)

*Tridymite*. This new variety of silicic acid, discovered by v. Rath (p. 805, this Min.) in Mexican porphyry, has been found in many localities in Europe; it is especially well characterized in the trachyte of Drachenfels and in the orthoclase-porphyry of Waldböckelheim.

610. *Wolframite*. Des Cloizeaux has shown that this species is monoclinic in crystallization. C. R. lxi, 868.











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